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A FURTHER NEW SPECIES OF *PALAEOBURMESEBUTHUS* LOURENÇO, 2002 FROM BURMITE (SCORPIONES: PALAEOBURMESEBUTHIDAE)

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Abstract: Scorpions remain relatively rare among the arthropods found trapped in amber. However, an impressive number of new pieces have become available in recent years, in particular in burmite (Lower Cretaceous of Myanmar). In several recent publications, a remarkable number of new species, genera and families have been described from Cretaceous amber. In the present study a new species of the family Palaeoburmesebuthidae Lourenço, 2015 is described from a specimen in burmite. The discovery of new burmite elements attests to the considerable degree of diversity in the Burmese amber-producing forests, and confirms that the family Palaeoburmesebuthidae is one of the most speciose elements of this Cretaceous fauna. Nevertheless, the increasing number of new taxa found in the Cretaceous amber of Myanmar could bring some problems for future identifications, as discussed in the present note.
Key words: Scorpiones, Palaeoburmesebuthidae, new species, fossil, Cretaceous, burmite, Myanmar.

Otra especie nueva de *Palaeoburmesebuthus* Lourenço, 2002 encontrada en burmita (Scorpiones: Palaeoburmesebuthidae)
Resumen: Los escorpiones siguen siendo relativamente escasos entre los artrópodos encontrados en ámbar. Sin embargo, en años recientes han ido apareciendo una cantidad impresionante de piezas nuevas, especialmente en burmita (Cretácico inferior de Mianmar). En varias publicaciones recientes se ha descrito un notable número de especies, géneros y familias nuevos a partir de ámbar cretácico. En el presente trabajo se describe una especie nueva de la familia Palaeoburmesebuthidae Lourenço, 2015 a partir de un ejemplar encontrado en burmita. El descubrimiento de novedades en burmita atestigua el alto grado de diversidad de los bosques birmanos productores de ámbar, y confirma que la familia Palaeoburmesebuthidae es una de las más ricas en especies de esta fauna cretácica. Sin embargo, el creciente número de taxones nuevos encontrados en el ámbar cretácico de Mianmar podría ocasionar problemas de identificación en el futuro, como se comenta en este artículo.
Palabras clave: Scorpiones, Palaeoburmesebuthidae, especie nueva, fósil, Cretácico, burmita, Myanmar.

Taxonomy / Taxonomía: *Palaeoburmesebuthus knodeli* **sp. n.**

Introduction

As already discussed in recent papers (Lourenço, 2016; Lourenço & Rossi, 2017), amber scorpions remain extremely rare. During the last 25 years, however, an increasing number of amber pieces containing scorpions have become available for study. These concern amber fossils in Mexican, Dominican and Baltic ambers, as well as in Cretaceous ambers from Lebanon, France and Myanmar. A synopsis of taxa recently described from amber was provided by Lourenço (2016). There has been a sharp rise in the number of contributions dealing mainly with specimens in Cretaceous Burmite due to the increasing commercial availability of this amber during the last 7-8 years. This is particularly true for numerous species described in the family Palaeoburmesebuthidae Lourenço, 2015 and in the genera *Palaeoburmesebuthus* Lourenço, 2002 and *Betaburmesebuthus* Lourenço, 2015. The descriptions of all these Burmite elements attest to the considerable faunal diversity in the Burmese amber-producing forests and, in particular, the status of the family Palaeoburmesebuthidae as the most speciose group within this scorpion fauna. However, the increased pace of descriptions will probably bring problems for future identifications, since many species found for a given group in Burmite are rather similar in morphology and several specimens are partially incomplete. An analogous situation can be found in some extant groups of scorpions, such as those of the subfamily Ananterinae Pocock, 1900 notably the genera *Ananteris* Thorell, 1891 and *Tityobuthus* Pocock, 1893. Their morphology is quite homogenous and identifications are based on minor characters, along with their ecology and biogeography (Lourenço, 1982; Lourenço et al., 2016). The latter parameters cannot, however, be applied in the case of amber specimens. The quality of extant material is uniform, but that of amber fossils can vary greatly. Some of the first descriptions of new fossil taxa were based only on fragments, as in the case of *Palaeoburmesebuthus grimaldii* Lourenço, 2002 (Lourenço, 2002), but as more and more taxa are known for a given group, the quality of the pieces required to justify the description of new taxa should be raised (Lourenço, 2016). Moreover, the person who will study the new pieces should have a complete knowledge of all the fossils previously described (see Lourenço, 2016 for details).

In the present study one new scorpion specimen from the Cretaceous amber of Myanmar (Burmite) is described as a new species of the genus *Palaeoburmesebuthus* Lourenço, 2002.

Material and methods

The specimen investigated is preserved in a clear block of pale yellow amber. However, the presence of numerous bubbles sometimes hampers observation. A number of characters, including several trichobothria, are visible, allowing a reasonable investigation. Other characters, however, are not observable because portions of the prosoma and pedipalps have been lost at the edge of the polished amber. The schematic drawings provided are interpretations of what was observable. Illustrations and measurements were produced with the aid of a Wild M5 stereomicroscope equipped with a drawing tube and an ocular micrometer. Measurements follow Stahnke (1970) and are given in mm. Trichobothrial notations follow Vachon (1974). Trichobothria are definitely recorded only

when their bothridia (areoles) could be observed. Other trichobothria may be suggested by the presence of transverse hairs.

Systematic description

Superfamily **BUTHOIDEA** C. L. Koch, 1837

Family **PALAEOBURMESEBUTHIDAE** Lourenço, 2015

Genus ***Palaeoburmesebuthus*** Lourenço, 2002

***Palaeoburmesebuthus knodeli* sp. n.**
Fig. 1-5.

HOLOTYPE: Adult male in moderately clear block (24.0 x 18.0 x 6 mm) of pale yellow amber. Type locality and horizon: Myanmar (Burma), Kachin (precise locality unknown); Lower Cretaceous.

SYNINCLUSIONS: Vegetal fragments, small insects of orders Diptera, Coleoptera and Hymenoptera and one interesting pseudoscorpion of the family Feaellidae Ellingsen, 1906 (Fig. 6-7).

ETYMOLOGY: The specific name honors Mr Herbert Knodel (Rotonda, USA), who arranged facilities for the study of the type specimen.

REPOSITORY. The type specimen is deposited in the collection of Mr Herbert Knodel (Rotonda, USA).

DIAGNOSIS.
General morphology similar to that of other species of the genus *Palaeoburmesebuthus* Lourenço, 2002 and some extant buthoid scorpions. The following combination of features can be used to diagnose the new species. Sternum subpentagonal. Tergites with three carinae, the lateral one very inconspicuous; granulation moderately to weakly marked. Sternites with small, oval to slit-like spiracles. Metasomal segments I and II with 10 carinae; III-IV with 8 carinae; V with 5 carinae; setation on all metasomal segments moderately marked. Telson granular, with a moderately developed subaculear tubercle. Pectines large and long, with 21-20 teeth. Trichobothrial pattern only partially observed, but with elements resembling those of extant buthid type A (Vachon, 1974): at least 5 dorsal and 2 external trichobothria on the femur and probably 4 internal; dorsal trichobothria disposed in α configuration (Vachon, 1975); one internal and 5 dorsal trichobothria on patella; 5-6 external trichobothria suggested on patella by the presence of fine setae; chelal trichobothria not observable. Tibial spurs present on legs III and IV, moderately marked.

The new species can be distinguished from the other species of the genus by the high number of teeth on the pectines and the presence of a moderate subaculear tubercle on the telson.

DESCRIPTION:

Coloration: yellow to slightly reddish-yellow; carapace and tergites yellow to reddish-yellow; metasomal segments reddish-yellow; telson reddish-yellow; aculeus reddish; pedipalps and legs yellow. Ventral aspect yellow; pectines pale yellow.

Morphology. Carapace not observable. Sternum pentagonal. Mesosomal tergites moderately to weakly granular, with one median carina; lateral carinae very inconspicuous; VII with five moderately to strongly marked carinae. Pectines large and long, with 21-20 teeth; fulcra inconspicuous. Sternites weakly granular to smooth, with small, oval to slit-like spiracles. Metasomal segments I to IV slightly rounded, with 10-10-8-8 carinae; segment V slender, with five carinae; dorsal carinae of segments I-IV with only minute spinoid granules; dorsal aspect of segments I to V weakly depressed; setation on all segments moderately to strongly marked. Telson with a moderately long, pear-shaped vesicle; moderately granular, with dorsal and lateral carinae and one moderately marked subaculear tubercle; aculeus long and weakly curved; setation moderately marked. Cheliceral dentition not observable. Pedipalp femur pentacarinate; patella with 5-6 carinae; internal face of femur and patella without any conspicuous spinoid granules. Chela not observable. Setation of pedipalps weakly marked. Trichobothriotaxy resembling type A (Vachon, 1974) of extant buthids: at least 4-5 dorsal, 2 external and possible 4 internal trichobothria on the femur; dorsal trichobothria disposed in α configuration (Vachon, 1975); 1 internal, 5 dorsal and no ventral trichobothria on patella; 5-6 external trichobothria suggested on patella by the presence of long, fine hairs. Tibial spurs present on legs III and IV, moderately marked.

Morphometric values (in mm) of male holotype of *Palaeoburmesebuthus knodeli* sp. n.
Total length 11.23 (including telson). Carapace: length, by extrapolation ca 1.27, anterior width indeterminable, posterior width 1.20. Mesosoma length 2.94. Metasomal segments. I: length 0.80, width 0.60; II: length 0.87, width 0.54; III: length 0.94, depth 0.54; IV: length 1.07, depth 0.54; V: length 1.67, depth 0.54. Telson length 1.67. Vesicle: depth 0.40. Pedipalp: femur length 1.07, width 0.40; patella length 1.20, width 0.67; chela length indeterminable, width 0.47; movable finger length indeterminable.

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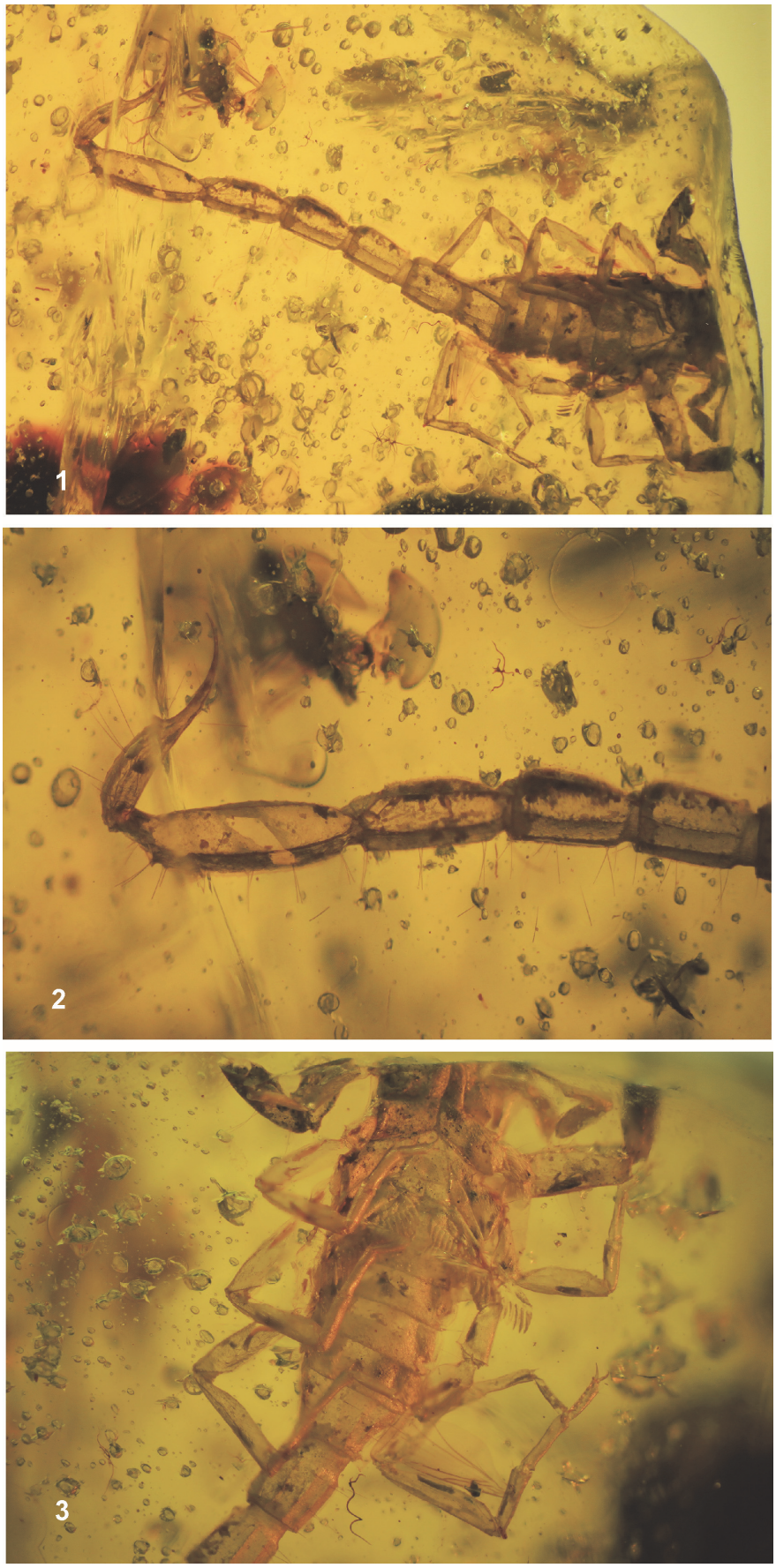
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Fig. 1-3. *Palaeoburmesebuthus knodeli* sp. n. Male holotype. **1**. Habitus, ventral aspect. **2.** Metasomal segments II-V and telson, lateral aspect. **3.** Ventral aspect, showing coxapophysis, sternum, genital operculum, pectines and sternites.



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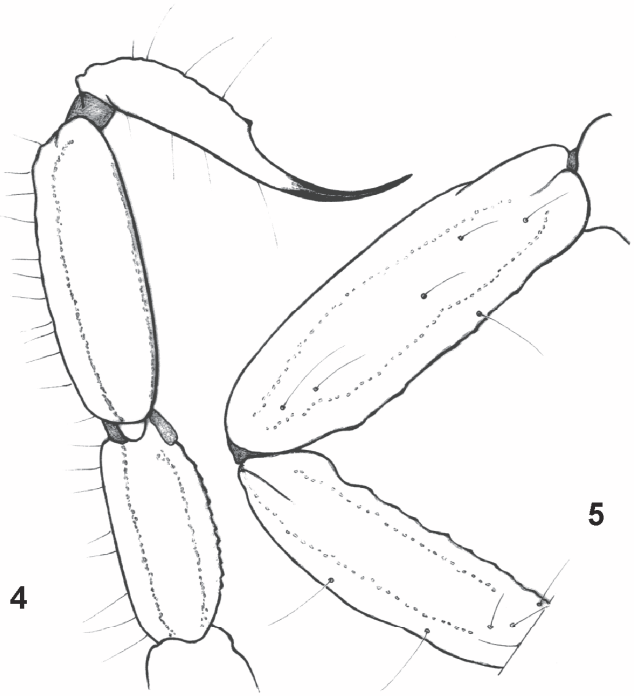
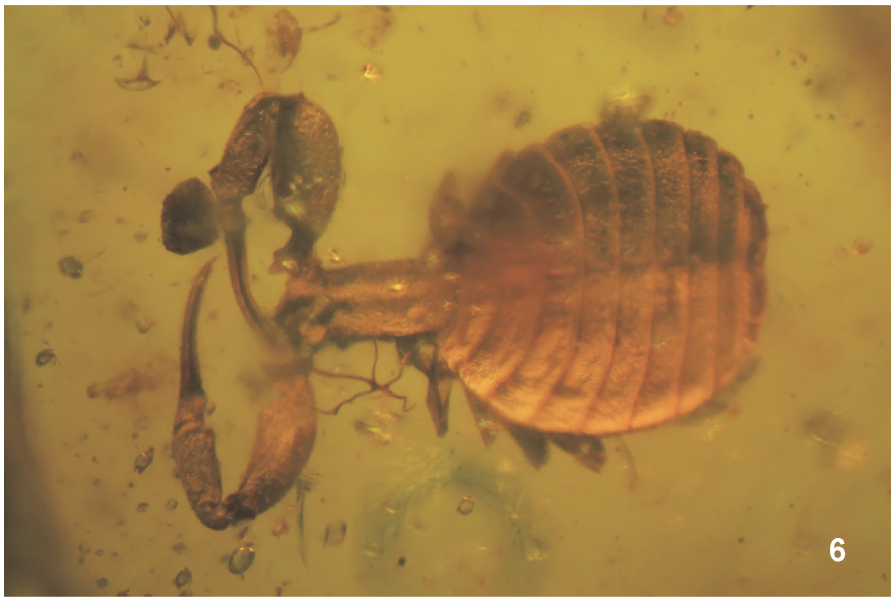


Fig. 4-5. *Palaeoburmesebuthus knodeli* sp. n. Male holotype. **4.** Metasomal segments IV-V and telson, lateral aspect. **5.** Trichobothrial pattern of femur and patella, dorsal aspect.



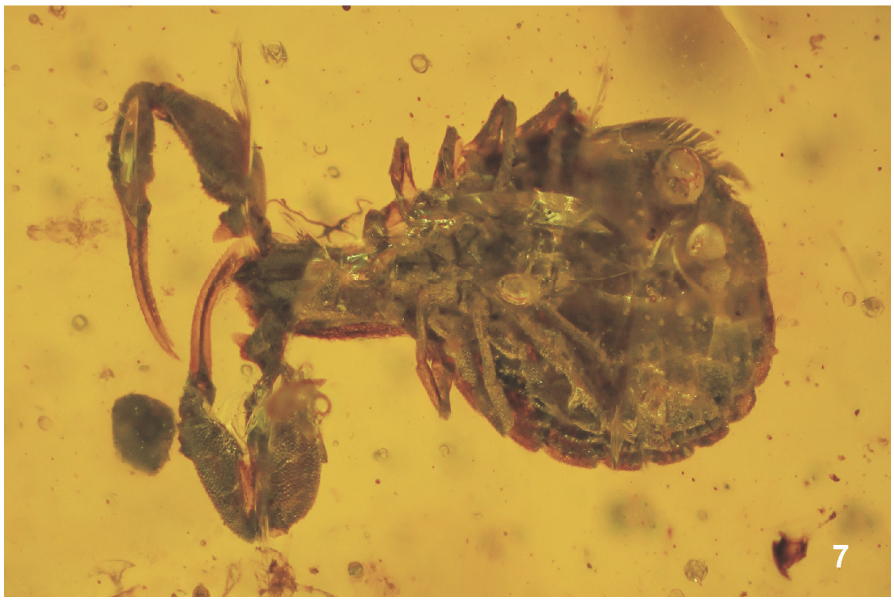


Fig. 6-7. Pseudoscorpion of the family Feaellidae Ellingsen, 1906. Habitus, dorsal and ventral aspect. Total length 2.27 mm. Pedipalp length 1.87 mm.